

CLAIMS

What is claimed is:

1. A data processing system for use with a process control system, the data processing system comprising:
- 5 a first processing plant communicatively coupled to an open network;
a second processing plant communicatively coupled to the open network;
a primary server communicatively coupled to the open network, wherein the primary server is adapted to execute a data processing application; and
a primary data historian communicatively coupled to the primary server,
- 10 wherein the primary server is adapted to receive process control information from the first and second processing plants via the open network and to store a portion of the received process control information in the primary data historian and wherein the primary server is further adapted to use the data processing application to generate analysis results and send the analysis results to the first and second plants via the open
- 15 network.
2. The system of claim 1, further comprising a redundant server that is communicatively coupled to the primary server and the primary data historian, wherein the redundant server is adapted to maintain synchronization with the primary
- 20 server and to supersede the primary server in response to one of a failure indication and degradation indication associated with the primary server.

3. The system of claim 2, further comprising a redundant data historian that is communicatively coupled to the primary server, the redundant server and the primary data historian, wherein the redundant data historian is adapted to maintain data synchronization with the primary data historian and to supersede the primary data historian in response to one of a failure indication and degradation indication of the primary data historian.

4. The system of claim 1, wherein the open network is the Internet.

5. The system of claim 1, wherein the first process plant is in a first geographic location and the second process plant is in a second geographic location different from the first geographic location.

6. The system of claim 1, wherein the first process plant is associated with a first business entity and the second process plant is associated with a second business entity.

7. The system of claim 1, wherein the data processing application is adapted to perform one of a plant optimization function, a real-time process monitoring function, a data reconciliation function, a plant emissions analysis function, a plant emissions control function, a dispatch function, a plant control function and an alarming function.

8. The system of claim 1, wherein the data processing application is adapted to perform a data correction function.

9. The system of claim 8, wherein the data correction function is one of a digital verification function, a data validation function, a data reconciliation function and a data source re-calibration function.

10. The system of claim 1, wherein the data processing application uses continuous emissions monitoring data to generate a plant emissions report.

11. The system of claim 10, wherein the data processing application generates the plant emissions report using a using a format defined by a governmental authority and communicates the plant emissions report to the governmental authority.

12. The system of claim 1, wherein the data processing application performs one of a plant emissions minimization and a plant emissions optimization using one of a shared vector gradient technique, a neural net technique and a Fibonacci search technique.

13. The system of claim 1, wherein the data processing application performs a compensatory control function in response to emissions data received from one of the first and second process plants.

14. The system of claim 1, wherein the data processing application uses an internet browser application as a visualization layer.

15. The system of claim 14, wherein the internet browser application is executed within a user interface that is physically remote from the first and second process plants.

16. The system of claim 1, wherein one of the first and second process plants further comprises one of an internet-enabled field device, an internet-enabled field device interface and a data concentration node.

17. The system of claim 16, wherein the one of the internet-enabled field device, an internet-enabled field device interface and a data concentration node includes an embedded data server and an embedded data historian communicatively coupled to the embedded data server.

18. The system of claim 1, wherein one of the first and second plants includes a digital communication network based on one of an RS485, Foundation Fieldbus, Ethernet TCP/IP and a wireless blue tooth protocol.

19. The system of claim 1, wherein one of the first and second plants and the primary server uses a data compression technique to transmit information via the open network.

20. A data processing system for use with a process control system, the data processing system comprising:

a cluster of redundant servers that are communicatively coupled via local network, wherein each of the redundant servers is adapted to acquire and process data;

a plurality of redundant data historians that are communicatively coupled to each other and to the cluster of redundant servers; and

a plurality of process plants that are communicatively coupled to the cluster of redundant servers via an internet, wherein the plurality of process plants is associated with a plurality of business entities, and wherein the cluster of redundant servers is adapted to execute a data processing application that processes information received from the plurality of process plants and generates analysis results that are accessible by a user via the internet.

21. The system of claim 20, wherein the data processing application includes one of a data analysis tool, a remote process management tool, a process optimization tool, a continuous emissions monitoring and minimization tool, a distributed power management tool, a dispatch and optimization tool, a centralized multi-client HVAC system monitoring and maintenance management tool, a remote water and waste processing facility monitoring and control tool, a pharmaceutical process tool, a biotechnology process tool and a semiconductor process tool.

22. The system of claim 20, wherein each of the plurality of process plants includes one of an internet-enabled field device, an internet-enabled field device interface and a data concentration node.

23. The system of claim 22, wherein the one of the internet-enabled field device, an internet-enabled field device interface and a data concentration node includes an embedded data server and an embedded data historian.

24. A method of acquiring, analyzing and reporting process plant data, comprising the steps of:

receiving information from a plurality of process plants associated with a plurality of business entities via an internet;

processing the received information using a cluster of redundant servers associated with a vendor business entity that is different from the plurality of business entities to generate analysis results;

storing the analysis results in a plurality of redundant data historians that are communicatively coupled to the cluster of redundant servers;

providing access to the analysis via the internet; and

billing each of the plurality of business entities based on one of respective data usage and type and processing time.

25. The method of claim 24, wherein the step of receiving the information from the plurality of process plants includes the step of receiving a first part of the information from a first process plant in a first geographic location and a second part of the information from a second process plant is in a second geographic location that is physically remote from the first geographic location, wherein the first process plant is associated with a first one of the plurality of business entities and the second process plant is associated with a second one of the plurality of business entities.

26. The method of claim 24, wherein the step of processing the received information includes the step of performing one of a plant optimization function, a real-time process monitoring function, a data reconciliation function, a plant emissions analysis function, a plant emissions control function, a dispatch function, a plant control function and an alarming function.

27. The method of claim 24, wherein the step of processing the received information using the cluster of redundant servers associated with the vendor business entity that is different from the plurality of business entities to generate the analysis results includes the step of performing a data correction function.

28. The method of claim 24, wherein the step of processing the received information using the cluster of redundant servers associated with the vendor business entity that is different from the plurality of business entities to generate the analysis results includes the step of using continuous emissions monitoring data to generate a plant emissions report.

29. The method of claim 28, wherein the step of using continuous emissions monitoring to generate the plant emissions report includes the step of using a using a format defined by a governmental authority.

30. The method of claim 24, wherein the step of processing the received information using the cluster of redundant servers associated with the vendor business entity that is different from the plurality of business entities to generate the analysis results includes the step of performing one of a plant emissions minimization and optimization using one of a shared vector gradient technique, a neural net technique and a Fibonacci search technique.

31. The method of claim 24, further comprising the step of sending a first part of the received information from one of the plurality of process plants to the cluster of redundant servers using one of an internet-enabled field device, an internet-enabled field device interface and a data concentration node.

32. The method of claim 31, wherein the step of sending the first part of the information from the one of the plurality of process plants to the cluster of redundant servers using the one of an internet-enabled field device, an internet-enabled field device interface and a data concentration node includes the step of using an embedded data server to send the first part of the information.

33. The method of claim 24, wherein the step of billing each of the plurality of business entities includes the step of billing each of the plurality of business entities in accordance with one of a rental agreement, an off-book operating lease agreement and a financial lease agreement for respective costs that are less than the costs associated with the costs that would otherwise be incurred by each of the plurality of processing plants to generate the analysis results.

34. The method of claim 24, wherein the analysis results include cost accounting information for each of the plurality of processing plants.

35. A data processing system for use with a process control system, the data processing system comprising:

a processing plant communicatively coupled to an open network;

a remote user interface communicatively coupled to the open network;

5 a server communicatively coupled to the open network, wherein the server is adapted to execute a data processing application;

a data historian communicatively coupled to the server, wherein the server is adapted to receive process control information from the processing plant via the open network and to store a portion of the received process control information in the data
10 historian and wherein the server is further adapted to use the data processing application to generate analysis results and send the analysis results to the remote user interface via the open network.

36. The system of claim 35, wherein the remote user interface is associated with a regulatory authority.

15 37. The system of claim 36, wherein the regulatory authority is the Environmental Protection Agency.

38. The system of claim 35, further comprising a second processing plant communicatively coupled to the open network that sends process control information associated with the second processing plant to the server via the open network.

20 39. The system of claim 35, further comprising a redundant server communicatively coupled to the server, wherein the redundant server is adapted to maintain synchronization with the server and to supersede the server in response to one of a failure indication and degradation indication associated with the server.